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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,331	10/31/2001	David B. Slater JR.	5000.113A	1789

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EXAMINER

VU, DAVID

ART UNIT PAPER NUMBER

2818

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/003,331

Applicant(s)

SLATER, DAVID B.

Examiner

DAVID VU

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 18-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group II (Claims 1-17) in Paper No. 7 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-4 are rejected under 35 U. S. C. 102(e) as being anticipated by Brandes et al., (US 6,268,229).

Regarding claims 1-4, Brandes et al, in related text (Col. 8, lines 1-16&59-67; Col. 7, lines 25-30; Col. 10, lines 6-7&25-31 and Col. 12, lines 12-20) and figure (Fig. 1d) disclose a method for forming an ohmic contact to silicon carbide for a semiconductor device, the method comprising: implanting phosphorus atoms into a surface of an n-type silicon carbide substrate thereby forming a layer on the silicon carbide substrate 4 having an increased concentration of phosphorus; annealing the implanted silicon carbide substrate; and depositing a layer of metal 7 on the implanted surface of the silicon carbide 4 that forms an ohmic contact between the phosphorus-implanted silicon carbide 4 and the deposited metal 7.

3. Claims 1-2 and 5-9 are rejected under 35 U. S. C. 102(e) as being anticipated by Brandes et al., (US 2002/0096684).

Regarding claims 1-2 and 5-9, Brandes et al, in related text ([0058]; [0068]; [0079] and Example 2) and figure (Fig. 6) disclose a method for forming an ohmic contact to silicon carbide for a semiconductor device, the method comprising: implanting phosphorus atoms into a surface of an n-type silicon carbide substrate 114 thereby forming a layer on the silicon carbide substrate 114 having an increased concentration of phosphorus; annealing the implanted silicon carbide substrate at 1100°C; and depositing a layer of metal (nickel) 115 on the implanted surface of the silicon carbide 114 that forms an ohmic contact between the phosphorus-implanted silicon carbide 114 and the deposited metal 115.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable Brandes et al., (US 6,268,229) in view of Hermansson et al (US 5,914,499)

Brandes et al disclose all claimed subject matter, but fails to expressly mention the implanting phosphorus at a plurality of implant energy levels

Hermansson et al, in related text (Col. 5, line 50-Col 6, line 5; Col. 7, lines 15-30 and Tables 1&2) disclose the implanting process at a plurality of implant energy levels. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the SiC layer of Brandes et al by the process as taught by Hermansson et al to obtain the proton energies which are required to achieve the structural changes desired at different depths in the silicon carbide layer. Multiple implants at different energy levels produce overlapping distributions, which ensure that production variations in insulator layer thickness do not cause implanted ions to miss the zone of the resistive thin film. By choosing the proper implant constituents and by controlling ion energy levels, dosages, and implantation time, highly selective control over the resistance and temperature coefficient of the thin film resistor is obtainable.

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In re claims 7 and 13, it would have been obvious to one with ordinary skill in the art at the time of the invention to form a SiC layer as taught by Hermansson et al., since the thickness, annealing temperature are well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art. Furthermore, the specification contains no disclosure of either the critical nature of the claimed dimension or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the particular dimensions are critical.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (703) 305-0391. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms., can be reached on (703) 308-4910.

DV

David Vu.



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PRIMARY EXAMINER